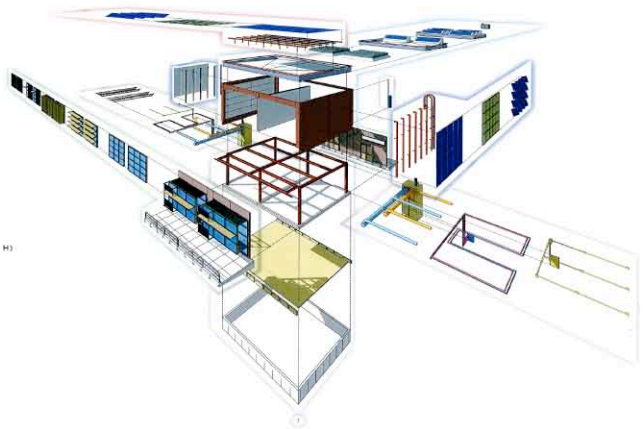
BERKELEY LAB
Lawrence Berkeley National Laboratory

A New National User Facility for Low Energy Integrated Building Systems

Lawrence Berkeley National Laboratory will soon begin building a new National User Facility, to study Low Energy Integrated Building Systems



This facility will contain a set of testbeds for building systems integration designed to address key technical challenges for low energy buildings. It will serve a national audience—and need—in an aggressive pursuit of DOE's energy efficiency goals for maximizing cost-effective energy efficiency strategies for existing and new buildings, and widespread deployment of these strategies.

The User Facility will be managed by researchers in Berkeley Lab's Environmental Energy Technologies Division (EETD). It will host visiting researchers from industry, academia and other national labs. The partners—architects and engineers, building own ers, building system suppliers, and utilities—represent the broad range of stakeholders who are essential to achieving low-energy new construction and retrofit building goals.

The Need for a Low Energy User Facility

Buildings account for more than 40 percent of carbon emissions in the United States. Looking ahead, the U.S. will add about 1.5–2 billion square feet per year of new floor space in commercial buildings. If we maintain business-as-usual, Energy Information Administration (EIA) estimates that by 2030 we will experience a 16 percent growth in buildings energy consumption. Strategies to reduce the energy consumption of new buildings and address the low energy retrofit of existing buildings will be essential in reducing energy use and climate-related impacts. The new laboratory facilities will help researchers to develop, test and validate the technologies, systems and design approaches, with an emphasis on energy savings and to be built and operated at an affordable cost.

Industrial and Academic Partners

Berkeley Lab is currently teaming with numerous organizations, including industry partners, utilities, universities, non-profits, and public agencies, all of whom indicated their support and interest in using the facility. It invites inquiries from potential partners in both the public and private sectors.

Capabilities

The Low Energy Integrated Building Systems User Facility will consist of a series of unique energy-efficient building systems testbeds to be located in new and existing buildings at Berkeley Lab. Researchers will be

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able to change out prototype building systems such as windows, lights, heating, ventilation, and air conditioning (HVAC), energy control systems, roofs, and skylights.

Users will be able to conduct focused research on one building system component, or to focus on integrated systems. For example, a research project could address energy-efficient window system prototypes, or the energy performance of an integrated lighting, daylighting, and HVAC system.

The facility will include a virtual design testbed, featuring EnergyPlus and other design tools, to perform integrated simulation-based design and life-cycle focused analysis.

A controls hardware testbed will allow users to evaluate the performance of wireless systems; test the interoperability of HVAC, lighting, shading, plug load, and electrical controls systems hardware and protocols; and assess monitoring tools.

Lawrence Berkeley National Laboratory is seeking partners to work with us and use the new facility. There are many ways to engage with the facility and Berkeley Lab researchers.

Possibilities include:

- **join a research advisory committee**
- **propose a series of tests**
- **donate systems to be tested**
- **test products in real built environment**
- **place a researcher in the facility**

Benefits

The Low Energy Integrated Building Systems User Facility provides the following key benefits:

- It advances the Department of Energy's goals for low-energy building new construction and retrofit building research.
- The facility can be used to validate and quantitatively demonstrate the value of whole-building systems integration (not just component efficiency improvements) in reducing energy consumption and improving indoor environment.
- The use of multiple discrete testbeds maximizes user access to the facility, increasing industry engagement and throughput.
- The facility will allow testing under controlled laboratory conditions as well as a lived-in office environment.

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